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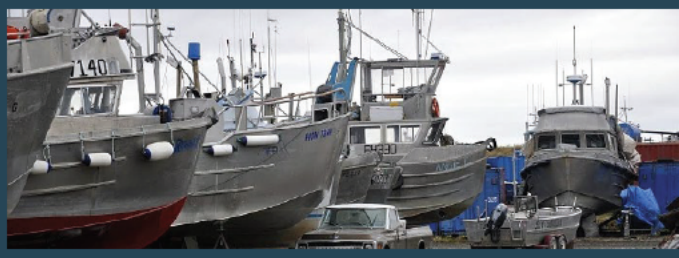
Final Determination of the U.S. Environmental Protection Agency Pursuant to Section 404(c) of the Clean Water Act

Pebble Deposit Area, Southwest Alaska



Office of Water, Washington, DC
www.epa.gov/bristolbay

January 2023

FINAL DETERMINATION OF THE U.S ENVIRONMENTAL PROTECTION AGENCY PURSUANT TO SECTION 404(C) OF THE CLEAN WATER ACT PEBBLE DEPOSIT AREA, SOUTHWEST ALASKA

U.S. Environmental Protection Agency
Office of Water

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CONTENTS

EXECUTIVE SUMMARY

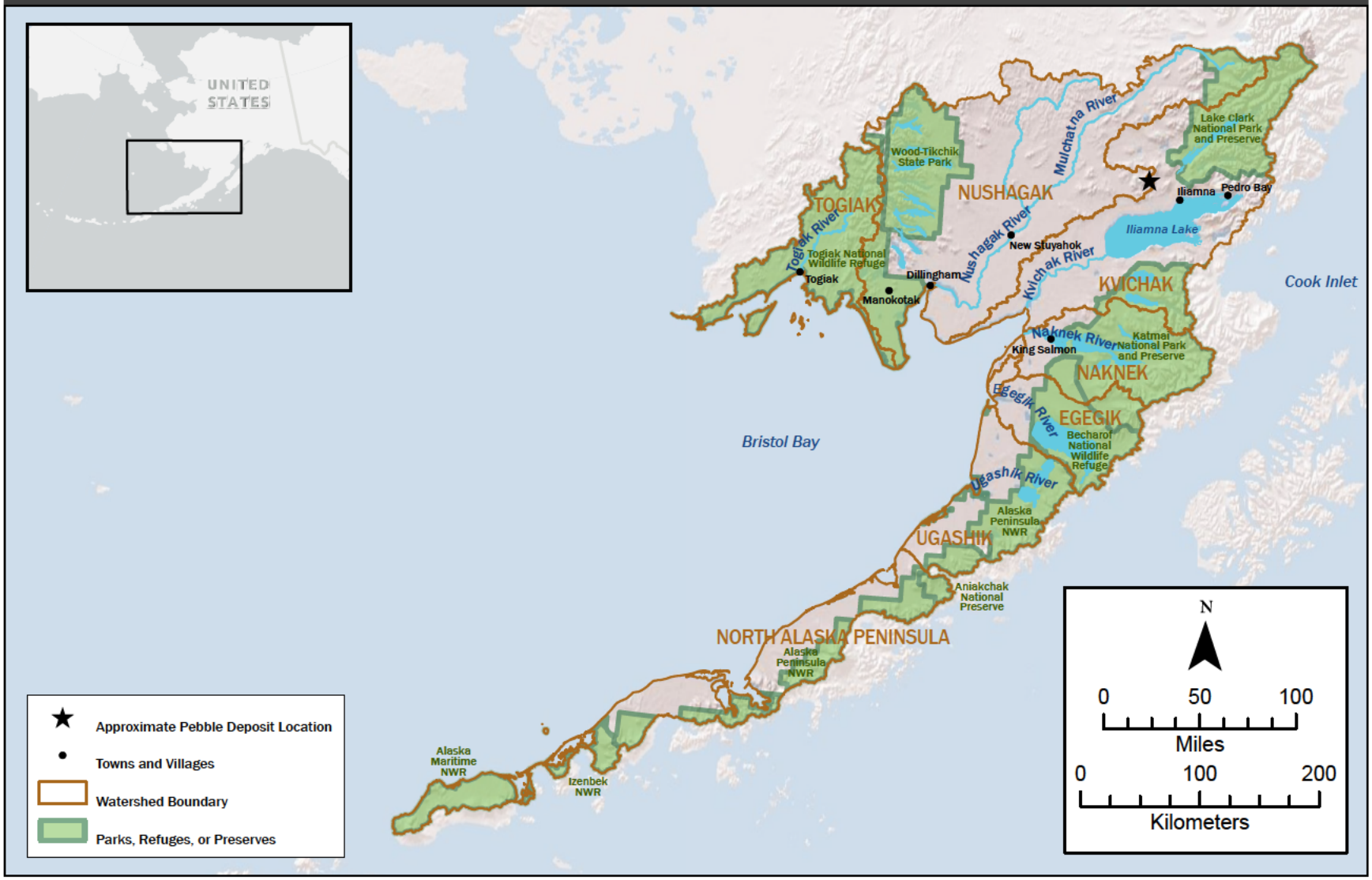
The U.S. Environmental Protection Agency (EPA) is prohibiting the specification of and restricting the use for specification of certain waters in the Bristol Bay watershed as disposal sites for certain discharges of dredged or fill material associated with development of a mine at the Pebble deposit, a large ore body in southwest Alaska. EPA is exercising its authority under Section 404(c) of the Clean Water Act (CWA) (Box ES-1) and its implementing regulations at 40 Code of Federal Regulations (CFR) Part 231 because the discharges of dredged or fill material associated with developing a mine evaluated in this final determination will have unacceptable adverse effects on anadromous[1] fishery areas in the Bristol Bay watershed. Development of a mine at the Pebble deposit has been the subject of study for more than two decades. This final determination is based on this extensive record of scientific and technical information and applies only to certain discharges of dredged or fill material associated with developing the Pebble deposit, not to any other resource development projects in the State of Alaska.

Alaska's Bristol Bay watershed (Figure ES-1) is an area of unparalleled ecological value, boasting salmon diversity and productivity unrivaled anywhere in North America. The Bristol Bay watershed provides intact, connected habitats—from headwaters to ocean—that support abundant, genetically diverse wild Pacific salmon populations. These salmon populations, in turn, help to maintain the productivity of the entire ecosystem, including numerous other fish and wildlife species. The region's salmon resources have supported Alaska Native cultures for thousands of years and continue to support one of the last intact salmon-based cultures in the world. Together, the Bristol Bay watershed's largely undisturbed aquatic habitats and productive salmon populations create this globally significant ecological and cultural resource.

The streams, wetlands, and other aquatic resources of the Bristol Bay watershed also provide the foundation for world-class, economically important, commercial and sport fisheries for salmon and other fishes. The Bristol Bay watershed supports the world's largest runs of Sockeye Salmon, producing approximately half of the world's Sockeye Salmon. These Sockeye Salmon represent the most abundant and diverse populations of this species remaining in the United States. Bristol Bay's Chinook Salmon runs are also frequently at or near the world's largest, and the region also supports significant Coho, Chum, and Pink salmon populations. Because no hatchery fishes are raised or released in the watershed, Bristol Bay's salmon populations are entirely wild and self-sustaining. Bristol Bay is remarkable as one of the last places on Earth with such bountiful and sustainable harvests of wild salmon. One of the main factors leading to the success of these fisheries is the fact that its diverse aquatic habitats are largely untouched and pristine, unlike the waters that support many other salmon fisheries worldwide.

[1] Anadromous fishes hatch in freshwater habitats, migrate to sea for a period of relatively rapid growth, and then return to freshwater habitats to spawn. For the purposes of this final determination, "anadromous fishes" refers only to Coho or Silver salmon (*Oncorhynchus kisutch*), Chinook or King salmon (*O. tshawytscha*), Sockeye or Red salmon (*O. nerka*), Chum or Dog salmon (*O. keta*), and Pink or Humpback salmon (*O. gorbuscha*).

Figure ES-1. The Bristol Bay watershed, composed of the Togiak, Nushagak, Kvichak, Naknek, Egegik, and Ugashik River watersheds and the North Alaska Peninsula. Only selected towns and villages are shown on this map.



Roughly 50 to 70 percent of Bristol Bay's Sockeye and large numbers of its Coho, Chinook, Pink, and Chum salmon are sustainably harvested in subsistence, commercial, and recreational fisheries before they can return to their natal lakes and streams to spawn. Thus, these salmon resources have significant nutritional, cultural, economic, and recreational value within and beyond the Bristol Bay region. The total economic value of the Bristol Bay watershed's salmon resources, including subsistence uses, was estimated at more than $2.2 billion in 2019 (McKinley Research Group 2021). The Bristol Bay commercial salmon fishery generates the most significant component of this economic activity, resulting in 15,000 jobs and an economic benefit of $2.0 billion in 2019, $990 million of which was in Alaska (McKinley Research Group 2021). Beyond their economic and environmental value, the diverse fishery and other aquatic and terrestrial resources of the Bristol Bay watershed, which depend upon the complex of healthy streams, wetlands, and other waters, are irreplaceable because they are inseparable from the cultures of the native people they support. Section 3 of this final determination provides an overview of the streams, wetlands, and other aquatic resources of the Bristol Bay watershed and discusses their role in supporting important subsistence, commercial, and recreational fisheries.

BOX ES-1. SECTION 404 OF THE CLEAN WATER ACT

The objective of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Section 404(c) of the CWA authorizes the U.S. Environmental Protection Agency (EPA) to (1) prohibit or withdraw the specification of any defined area as a disposal site, and (2) deny, restrict, or withdraw the use of any defined area for specification as a disposal site, whenever it determines, after notice and opportunity for public hearings, that the discharge of dredged or fill material into the area will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas. EPA has used its CWA Section 404(c) authority judiciously, having completed only 13 CWA Section 404(c) actions in the 50-year history of the CWA prior to this final determination.

Proposed Mine at the Pebble Deposit

The Pebble deposit, a large, low-grade deposit containing copper-, gold-, and molybdenum-bearing minerals, is located at the headwaters of the pristine Bristol Bay watershed. The Pebble deposit underlies portions of the South Fork Koktuli River (SFK), North Fork Koktuli River (NFK), and Upper Talarik Creek (UTC) watersheds, which drain to two of the largest rivers in the Bristol Bay watershed, the Nushagak and Kvichak Rivers (Figure ES-2).

The USACE permit denial addresses only PLP's specific permit application for the 2020 Mine Plan; it does not address any other potential plans to develop the Pebble deposit. Information regarding the Pebble deposit and the 2020 Mine Plan can be found in Section 2 of this final determination.

2014 Proposed Determination

For more than a decade, many Alaska Native communities in the Bristol Bay watershed; subsistence, commercial, and recreational fishing interests; conservation groups; and others have raised concerns about the potential impacts that a large-scale mine at the Pebble deposit could have on the region's socially, ecologically, and economically important fishery areas. Starting in May 2010, these groups and others began requesting that EPA use its CWA Section 404(c) authority to protect the region's fishery areas. In February 2011, EPA decided to conduct an ecological risk assessment before considering additional steps. In January 2014, after three years of study, two rounds of public comment, and independent, external peer review, EPA released its *Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay, Alaska*[3] (Bristol Bay Assessment or BBA) (EPA 2014). In July 2014, after careful consideration of available information, including the findings of the BBA and consultation with PLP and the State of Alaska, EPA Region 10 published a proposed determination under Section 404(c) of the CWA to restrict the use of certain waters in the SFK, NFK, and UTC watersheds as disposal sites for dredged or fill material associated with mining the Pebble deposit (2014 Proposed Determination) for public comment.

As a result of litigation brought by PLP, EPA Region 10's CWA Section 404(c) review process was halted in November 2014 until EPA and PLP resolved the case in a May 2017 settlement agreement. As a condition of that settlement agreement, EPA Region 10 initiated a process to propose to withdraw the 2014 Proposed Determination, and EPA ultimately withdrew the 2014 Proposed Determination in August 2019. In October 2019, 20 tribal, fishing, environmental, and conservation groups challenged EPA's withdrawal of the 2014 Proposed Determination. The ultimate result of the litigation that began in October 2019 was an October 29, 2021 decision by the U.S. District Court for the District of Alaska to vacate EPA's 2019 decision to withdraw the 2014 Proposed Determination and remand the action to the Agency for reconsideration.

The District Court's vacatur of EPA's 2019 decision to withdraw the 2014 Proposed Determination had the effect of reinstating the 2014 Proposed Determination and reinitiating EPA's CWA Section 404(c) review process. The next step in the CWA Section 404(c) review process required the Region 10 Regional Administrator to decide whether to withdraw the 2014 Proposed Determination or prepare a recommended determination within 30 days. On November 23, 2021, EPA Region 10 published in the *Federal Register* a notice extending the applicable time requirement through May 31, 2022, to provide sufficient time to consider available information and determine the appropriate next step in the CWA

[3] EPA conducted the BBA consistent with its authority under CWA Section 104(a) and (b). For more information about EPA's efforts in Bristol Bay or copies of the Bristol Bay Assessment, see http://www.epa.gov/bristolbay.

Section 404(c) review process. In its notice, EPA concluded that it should consider information that had become available since EPA issued the 2014 Proposed Determination before making a decision. Information regarding the 2014 Proposed Determination and the history of EPA's work in the Bristol Bay watershed can be found in Section 2 of this final determination.

2022 Proposed Determination

To determine the appropriate next step in this CWA Section 404(c) process, EPA Region 10 considered a wide array of information that had become available since it issued the 2014 Proposed Determination, including the following:

- More than 670,000 public comments submitted to EPA Region 10 in response to the 2014 Proposed Determination.
- PLP's CWA Section 404 permit application, including the 2020 Mine Plan (PLP 2020b).
- USACE's FEIS evaluating the 2020 Mine Plan, including the FEIS appendices, technical support documents, and references (USACE 2020a).
- The 12-week coordination process between EPA, the U.S. Fish and Wildlife Service, and USACE in spring 2020 to evaluate PLP's proposed project for compliance with the CWA Section 404(b)(1) Guidelines.
- USACE's ROD denying PLP's CWA Section 404 permit application for the 2020 Mine Plan, including the ROD supporting documents (USACE 2020b).
- NDM's *Pebble Project Preliminary Economic Assessment* dated September 9, 2021 (Kalanchey et al. 2021).
- Updated data regarding fishery resources in the Bristol Bay watershed.
- New scientific and technical publications.

In January 2022, consistent with its regulatory procedures for proposed determinations at 40 CFR 231.3(a), EPA Region 10 notified USACE, the Alaska Department of Natural Resources (ADNR), PLP, Pebble East Claims Corporation, Pebble West Claims Corporation, and Chuchuna Minerals[4] (the Parties) of EPA Region 10's intention to issue a revised proposed determination because, based on a review of information available to that date, it continued to believe that the discharge of dredged or fill material associated with mining the Pebble deposit could result in unacceptable adverse effects on important fishery areas. EPA Region 10 provided the Parties with an opportunity to consult with the Region and to submit information for the record to demonstrate that no unacceptable adverse effects would result

[4] EPA Region 10 notified Chuchuna Minerals because USACE's FEIS for the 2020 Mine Plan indicates that it is reasonably foreseeable for discharges associated with mining the Pebble deposit to expand in the future into portions of areas where Chuchuna Minerals holds mining claims.

from discharges associated with mining the Pebble deposit or that actions could be taken to prevent unacceptable adverse effects on important fishery areas.

ADNR, PLP, and Chuchuna Minerals submitted response letters asserting legal, policy, scientific, and technical arguments, and EPA met individually with PLP and Chuchuna Minerals. Based on the information provided to the Agency, ADNR, PLP, and Chuchuna Minerals did not demonstrate to the satisfaction of EPA Region 10 that no unacceptable adverse effects would occur as a result of the discharge of dredged or fill material associated with mining the Pebble deposit (Section 2.2.2). Thus, EPA Region 10 decided that the appropriate next step in this CWA Section 404(c) process was the publication of a revised proposed determination (the 2022 Proposed Determination).

In May 2022, EPA Region 10 published in the *Federal Register* a notice of availability for the 2022 Proposed Determination under Section 404(c) of the CWA to prohibit the specification of and restrict the use for specification of certain waters in the SFK, NFK, and UTC watersheds as disposal sites for the discharge of dredged or fill material associated with mining the Pebble deposit (87 FR 32021, May 26, 2022). The notice started a public comment period ending on July 5, 2022. On June 16 and 17, 2022, EPA Region 10 held three public hearings on the 2022 Proposed Determination: two in-person hearings in the Bristol Bay region (in Dillingham and Iliamna) and one virtual hearing. More than 186 people participated in the three hearings, 111 of whom provided oral statements.

EPA Region 10 received requests to extend the public comment period, as well as requests not to extend the public comment period. EPA Region 10 considered each of these requests and found good cause existed pursuant to 40 CFR 231.8 to extend the public comment period through September 6, 2022 (87 FR 39091, June 30, 2022).

On September 6, 2022, EPA Region 10 published in the *Federal Register* a notice to extend the period for the EPA Region 10 Regional Administrator to evaluate public comments. According to the notice, EPA found good cause existed pursuant to 40 CFR 231.8 to extend the time period provided in 40 CFR 231.5(a) to either withdraw the proposed determination or to prepare a recommended determination through no later than December 2, 2022, to help ensure full consideration of the extensive administrative record including all public comments (87 FR 54498, September 6, 2022). In addition to the testimony taken at the hearings, EPA Region 10 received more than 582,000 written comments during the public comment period.

EPA Region 10 completed its review of the extensive administrative record, including all public comments. The Regional Administrator determined that the discharge of dredged or fill material associated with developing the Pebble deposit would be likely to result in unacceptable adverse effects on anadromous fishery areas and, thus, prepared a recommended determination. The recommended determination, along with the administrative record, was transmitted to EPA's Assistant Administrator for Water on December 1, 2022, for review and final action.

The Final Determination

On December 2, 2022, the Assistant Administrator for Water notified the Parties[5] that she had received EPA Region 10's recommended determination and, consistent with EPA's CWA Section 404(c) regulations at 40 CFR 231.6, provided them the opportunity to notify EPA of their intent to take corrective action to prevent unacceptable adverse effects on anadromous fishery areas from certain discharges of dredged or fill material associated with developing the Pebble deposit.

ADNR and PLP submitted response letters asserting legal, policy, scientific, and technical arguments that each had previously raised during consultation with EPA prior to issuance of the proposed determination and in public comments on the proposed determination. EPA also met with ADNR and other representatives from the State of Alaska. USACE and Chuchuna Minerals also submitted response letters. None of the Parties identified corrective action to prevent unacceptable adverse effects satisfactory to the Assistant Administrator for Water. Section 2 of this final determination includes a summary of the Assistant Administrator for Water's consultation with the Parties.

Following review of EPA Region 10's recommended determination and the extensive administrative record supporting the Regional Administrator's decision, including all public comments, the Assistant Administrator for Water has determined that certain discharges of dredged or fill material associated with developing the Pebble deposit into certain waters of the United States will have unacceptable adverse effects on anadromous fishery areas and affirms the recommended determination.[6] Section 4 of this final determination provides the basis for EPA's findings regarding unacceptable adverse effects on anadromous fishery areas.

As demonstrated in the FEIS and ROD, construction and routine operation of the mine proposed in the 2020 Mine Plan would result in the discharge of dredged or fill material into waters of the United States, including streams, wetlands, lakes, and ponds overlying the Pebble deposit and within adjacent watersheds. The direct effects (i.e., resulting from placement of fill in aquatic habitats) and certain secondary effects of such discharges (i.e., associated with discharges of dredged or fill material, but not resulting from the actual placement of such material) would result in the total loss of aquatic habitats important to anadromous fishes. These losses would result from the construction and routine operation of the various components of the mine site, including the open pit, bulk TSF, pyritic TSF, power plant, WMPs, WTPs, milling/processing facilities, and supporting infrastructure. According to the FEIS and ROD, discharges of dredged or fill material to construct and operate the mine site proposed in the 2020 Mine Plan would result in the total loss of approximately 99.7 miles (160.5 km) of stream habitat, representing approximately 8.5 miles (13.7 km) of anadromous fish streams and 91 miles (147 km) of additional streams that support anadromous fish streams. Such discharges of dredged or fill material

[5] Consistent with EPA's regulations, the USACE representative who received this notification was the Chief of Engineers.

[6] EPA has made additional clarifications throughout this final determination based on EPA Office of Water's review of the recommended determination and administrative record, as well as final consultation with the Parties, conducted consistent with 40 CFR 231.6.

also would result in the total loss of approximately 2,108 acres (8.5 km^2) of wetlands and other waters in the SFK and NFK watersheds that support anadromous fish streams.

Additional secondary effects of the proposed discharges of dredged or fill material at the mine site would degrade anadromous fishery areas downstream of the mine site. Specifically, the stream, wetland, and other aquatic resource losses from the footprint of the 2020 Mine Plan would reverberate downstream, depriving downstream anadromous fish habitats of nutrients, groundwater inputs, and other ecological subsidies from lost upstream aquatic resources. Further, streamflow alterations from water capture, withdrawal, storage, treatment, or release at the mine site are another secondary effect of the discharge of dredged or fill material associated with the construction and routine operation of the 2020 Mine Plan. Such streamflow alterations would adversely affect approximately 29 miles (46.7 km) of anadromous fish streams downstream of the mine site due to greater than 20 percent changes in average monthly streamflow.[7] These streamflow alterations would result in major changes in ecosystem structure and function and would reduce both the extent and quality of anadromous fish habitat downstream of the mine. As recognized in the FEIS, all instances of complete loss of aquatic habitat and most impairment to fish habitat function would be permanent and "no other wild salmon fishery in the world exists in conjunction with an active mine of this size" (USACE 2020a: Page 4.6-9).

Although Alaska has many streams and wetlands that support salmon, individual streams, stream reaches, wetlands, lakes, and ponds play a critical role in supporting individual salmon populations and protecting the genetic diversity of Bristol Bay's wild salmon populations. The diverse array of watershed features across the region creates and sustains a diversity of aquatic habitats that support multiple populations of salmon with asynchronous run timings and habitat use patterns (i.e., biocomplexity, after Hilborn et al. 2003). These population differences are reflected in salmon genetic diversity and adaptation to local conditions within Bristol Bay's component watersheds (e.g., Quinn et al. 2012) and provide stability to the overall system (Schindler et al. 2010). Impacts of the 2020 Mine Plan are concentrated in the SFK and NFK watersheds, which are a part of the Nushagak River watershed. Recent analysis specific to the Nushagak River watershed underscores the important role that the streams, wetlands, lakes, and ponds across the entire Nushagak River watershed, including those that would be adversely affected by the 2020 Mine Plan, play in stabilizing the Nushagak River's productive Sockeye and Chinook salmon fisheries (Brennan et al. 2019). Similarly, both the Koktuli River (the SFK and NFK are tributaries to the Koktuli River) and UTC have been documented to support genetically distinct populations of Sockeye Salmon (Dann et al. 2012, Shedd et al. 2016, Dann et al. 2018). Loss of salmon habitats and associated salmon diversity in the SFK, NFK, and UTC watersheds would erode both the habitat complexity and biocomplexity that help buffer these populations from sudden and extreme changes in abundance, and ultimately maintain their productivity.

[7] Streamflow alterations would vary seasonally. Streamflow reductions exceeding 20 percent of average monthly streamflow would occur in at least one month per year in at least 13.1 miles (21.4 km) of anadromous fish streams downstream of the mine site, and operation of the 2020 Mine Plan would increase streamflow by more than 20 percent of baseline average monthly streamflow in at least 25.7 miles (41.3 km) of downstream anadromous fish streams due to WTP discharges.

In addition to supporting genetically distinct salmon populations, the streams and wetlands draining the Pebble deposit area provide key habitat for numerous other fish species and supply water, invertebrates, organic matter, and other resources to downstream waters (Meyer et al. 2007, Colvin et al. 2019, Koenig et al. 2019). This is particularly true in dendritic stream networks like the SFK, NFK, and UTC systems, which have a high density of headwater streams. As a result, headwater streams and wetlands play a vital role in maintaining diverse, abundant anadromous fish populations—both by providing important fish habitat and supplying the energy and other resources needed to support anadromous fishes in connected downstream habitats.

EPA has determined the discharge of dredged or fill material for the construction and routine operation of the 2020 Mine Plan will have unacceptable adverse effects on anadromous fishery areas in the SFK and NFK watersheds. In this regard, EPA makes independent unacceptability findings, each of which is based on one or more factors, including the large amount of permanent loss of anadromous fish habitat (including spawning and breeding areas); the particular importance of the permanently lost habitat for juvenile Coho and Chinook salmon; the degradation of and thus damage to additional downstream spawning and rearing habitat for Coho, Chinook, and Sockeye salmon due to the loss of ecological subsidies provided by eliminated streams, wetlands, and other waters; and the resulting erosion of and thus damage to habitat complexity and biocomplexity within the SFK and NFK watersheds, both of which are key to the abundance and stability of salmon populations within these watersheds. EPA has also determined that discharges of dredged or fill material associated with developing the Pebble deposit anywhere in the mine site area (Figure ES-5) within the SFK and NFK watersheds that would result in the same or greater levels of loss or streamflow changes as the 2020 Mine Plan also will have unacceptable adverse effects on anadromous fishery areas in these watersheds, because such discharges would involve the same aquatic resources characterized as part of the evaluation of the 2020 Mine Plan. These conclusions support the prohibition described in Section 5.1 of this final determination.

Further, EPA has determined the discharge of dredged or fill material for the construction and routine operation of a mine at the Pebble deposit anywhere in the SFK, NFK, and UTC watersheds will have unacceptable adverse effects on anadromous fishery areas if the effects of such discharges are similar or greater in nature and magnitude to the adverse effects of the 2020 Mine Plan. In this regard, EPA makes independent unacceptability findings, each of which is based on one or more factors, including the pristine condition and ecological importance of anadromous habitat throughout the SFK, NFK, and UTC watersheds; how aquatic habitats across these three watersheds function similarly to support productive anadromous fishery areas; the large amount of permanent loss of anadromous fish habitat; the degradation of and thus damage to additional downstream spawning and rearing habitat for Coho, Chinook, and Sockeye salmon due to the loss of ecological subsidies provided by the eliminated streams, wetlands, and other waters; and the resulting erosion of and thus damage to habitat complexity and biocomplexity within the SFK, NFK, and UTC watersheds, both of which are key to the abundance and stability of salmon populations within these watersheds. This conclusion supports the restriction described in Section 5.2 of this final determination.

Overview of Prohibition and Restriction in the Final Determination

This final determination includes two parts: a prohibition and a restriction, which are described in more detail in Sections 5.1 and 5.2, respectively.

Prohibition

The EPA Assistant Administrator for Water has determined that the discharges of dredged or fill material for the construction and routine operation of the mine identified in the 2020 Mine Plan (PLP 2020b) at the Pebble deposit will have unacceptable adverse effects on anadromous fishery areas in the SFK and NFK watersheds. Based on information in PLP's CWA Section 404 permit application, the FEIS, and the ROD, such discharges would result in the following aquatic resource losses and streamflow changes:

- The loss of approximately 8.5 miles (13.7 km) of documented anadromous fish streams (Section 4.2.1).
- The loss of approximately 91 miles (147 km) of additional streams that support anadromous fish streams (Section 4.2.2).
- The loss of approximately 2,108 acres (8.5 km^2) of wetlands and other waters that support anadromous fish streams (Section 4.2.3).
- Adverse impacts on approximately 29 additional miles (46.7 km) of anadromous fish streams resulting from greater than 20 percent changes in average monthly streamflow (Section 4.2.4).

EPA has also determined that discharges of dredged or fill material for the construction and routine operation of a mine to develop the Pebble deposit anywhere in the mine site area within the SFK and NFK watersheds that would result in the same or greater levels of loss or streamflow changes as the 2020 Mine Plan also will have unacceptable adverse effects on anadromous fishery areas in these watersheds, because such discharges would involve the same aquatic resources characterized as part of the evaluation of the 2020 Mine Plan.

Sections 4.2.1 through 4.2.4 describe the basis for EPA's determination that each of the above losses and changes to streamflow independently will have unacceptable adverse effects on anadromous fishery areas (including spawning and breeding areas).

Accordingly, the Assistant Administrator for Water prohibits the specification of waters of the United States within the Defined Area for Prohibition (Figures ES-6, ES-7, and ES-8) as disposal sites for the discharge of dredged or fill material for the construction and routine operation of the 2020 Mine Plan. For purposes of the prohibition, the "2020 Mine Plan" is (1) the mine plan described in PLP's June 8, 2020 CWA Section 404 permit application (PLP 2020b) and the FEIS (USACE 2020a); and (2) future proposals to construct and operate a mine to develop the Pebble deposit with discharges of dredged or fill material in the Defined Area for Prohibition that would result in the same or greater levels of loss or

streamflow changes as the mine plan described in PLP's June 8, 2020 CWA Section 404 permit application.[8] Because each of the losses or streamflow changes described in Sections 4.2.1 through 4.2.4 independently will have unacceptable adverse effects on anadromous fishery areas, future proposals to construct and operate a mine to develop the Pebble deposit that result in any one of these losses or streamflow changes will be subject to the prohibition.

Restriction

The Assistant Administrator for Water has determined that discharges of dredged or fill material associated with future proposals to construct and operate a mine to develop the Pebble deposit will have unacceptable adverse effects on anadromous fishery areas (including spawning and breeding areas) anywhere in the SFK, NFK, and UTC watersheds if the adverse effects of such discharges are similar or greater in nature[9] and magnitude[10] to the adverse effects of the 2020 Mine Plan described in Sections 4.2.1 through 4.2.4 of this final determination.

Accordingly, the Assistant Administrator for Water restricts the use of waters of the United States within the Defined Area for Restriction (Figures ES-7 and ES-8) for specification as disposal sites for the discharge of dredged or fill material associated with future proposals to construct and operate a mine to develop the Pebble deposit that would either individually or cumulatively result in adverse effects similar or greater in nature and magnitude to those described in Sections 4.2.1 through 4.2.4 of this final determination. Because each of the losses or streamflow changes described in Sections 4.2.1 through 4.2.4 independently will have unacceptable adverse effects on anadromous fishery areas, proposals to discharge dredged or fill material that result in any one of these losses or streamflow changes will be subject to the restriction. To the extent that future discharges are subject to the prohibition, the restriction will not apply.

[8] By clarifying that the "2020 Mine Plan" includes, for the purposes of the prohibition, future proposals to construct and operate a mine to develop the Pebble deposit with discharges of dredged or fill material in the Defined Area for Prohibition that would result in the same or greater levels of loss or streamflow changes as the mine plan described in PLP's June 8, 2020 CWA Section 404 permit application, EPA ensures that future applicants cannot circumvent the prohibition by proposing small changes in the location of discharges within the mine site that would not result in any change to the levels of aquatic resource loss or streamflow change, or that would result in greater levels of aquatic resource loss or streamflow change. In doing so, EPA gives full effect to the purpose of the prohibition to prevent adverse effects at the mine site that EPA has already determined are unacceptable.

[9] *Nature* means type or main characteristic (see Cambridge Dictionary available at: https://dictionary.cambridge.org/us/dictionary/english/nature).

[10] *Magnitude* refers to size or importance (see Cambridge Dictionary available at: https://dictionary.cambridge.org/us/dictionary/english/magnitude).

to engage in one or more additional multi-year NEPA and CWA Section 404 processes for future proposals to discharge dredged or fill material associated with developing the Pebble deposit into waters of the United States within the SFK, NFK, or UTC watersheds that will result in adverse effects that EPA has already determined are unacceptable. By acting now, based on an extensive and carefully considered record, EPA promotes regulatory certainty for all interested parties, including USACE and the regulated community; facilitates planning by proponents; and avoids unnecessary expenditure of additional resources by all interested parties (see 44 FR 58077). Ultimately, by acting now, EPA also facilitates "comprehensive rather than piecemeal protection" of important aquatic resources (see *id*.) by ensuring the protection of valuable anadromous fishery areas in the SFK, NFK, and UTC watersheds against unacceptable adverse effects from the discharges evaluated in this final determination.

Conclusion

Discharges of dredged or fill material to construct and operate the 2020 Mine Plan's proposed mine site alone would result in the permanent loss of approximately 8.5 miles (13.7 km) of anadromous fish streams, 91 miles (147 km) of additional streams that support anadromous fish streams, and approximately 2,108 acres (8.5 km^2) of wetlands and other waters in the SFK and NFK watersheds that support anadromous fish streams. These discharges would also result in streamflow alterations that would adversely affect approximately 29 miles (46.7 km) of additional anadromous fish streams downstream of the mine site due to greater than 20 percent changes in average monthly streamflow. The aquatic resources that would be lost or damaged play an important role in supporting salmon populations in the SFK, NFK, and UTC watersheds.

EPA has determined that the large-scale loss of and damage to headwater streams, wetlands, and other aquatic resources that support salmon populations in the SFK, NFK, and UTC watersheds from the discharge of dredged or fill material for the construction and routine operation of the 2020 Mine Plan will have unacceptable adverse effects on anadromous fishery areas in the SFK, NFK, and UTC watersheds.

To prevent these unacceptable adverse effects, this final determination prohibits the specification of certain waters of the United States in the SFK and NFK watersheds as disposal sites for the discharge of dredged or fill material for the construction and routine operation of the 2020 Mine Plan, including future proposals to construct and operate a mine to develop the Pebble deposit with discharges of dredged or fill material into waters of the United States that would result in the same or greater levels of aquatic resource loss or streamflow changes as the 2020 Mine Plan.

This final determination also restricts the use for specification of certain waters of the United States in the SFK, NFK, and UTC watersheds as disposal sites for the discharge of dredged or fill material associated with future proposals to construct and operate a mine to develop the Pebble deposit with discharges of dredged or fill material into waters of the United States that would result in adverse effects

similar or greater in nature and magnitude to the adverse effects of the 2020 Mine Plan (see Section 5 of this final determination).

Proposals to discharge dredged or fill material into waters of the United States associated with developing the Pebble deposit that are not subject to this determination remain subject to all statutory and regulatory authorities and requirements under CWA Section 404.

In light of the immense and unique economic, social, cultural, and ecological value of the aquatic resources in the region, including the fishery areas in the SFK, NFK, and UTC watersheds, and their susceptibility to damage, EPA will carefully evaluate all future proposals to discharge dredged or fill material in the region.

SECTION 2. PROJECT DESCRIPTION AND BACKGROUND

2.1 Project Description

2.1.1 Overview of the Pebble Deposit

Several known mineral deposits are located in the Nushagak and Kvichak River watersheds (EPA 2014, USACE 2020a, Kalanchey et al. 2021). The deposit types occurring or likely to occur in the region include porphyry copper, intrusion-related gold, and copper and iron skarn. The potential for mining development within these watersheds appears to be greatest for the Pebble deposit because significant exploration activity has occurred at this deposit for many years and a significant amount of information about this deposit is available.

The Pebble deposit is a large, low-grade deposit containing copper-, gold-, and molybdenum-bearing minerals that underlies portions of the SFK, NFK, and UTC watersheds. The SFK and NFK watersheds are part of the Nushagak River watershed, and the UTC watershed is part of the Kvichak River watershed (Figure ES-2). Extraction at the Pebble deposit would involve the creation of a large open pit and the production of large amounts of waste rock and mine tailings (USACE 2020a).

The Pebble deposit extends over an area of at least 1.9 by 2.8 miles and consists of two contiguous segments, Pebble West and Pebble East (Ghaffari et al. 2011). The approximate center of the deposit is about 9.2 miles north–northeast of Sharp Mountain and 18.7 miles northwest of Iliamna. It covers portions of sections 14 to 16, 20 to 23, and 26 to 29, T. 3 S., R. 35 W., Seward Meridian.[16] The full extent of the Pebble deposit is not yet defined, but Kalanchey et al. (2021) indicate that the Pebble mineral resource may approach 11 billion tons of ore.

PLP holds the largest mine claim block in the Nushagak and Kvichak River watersheds. In 2017, PLP submitted a CWA Section 404 permit application to USACE to develop a mine at the Pebble deposit, which triggered USACE's development of a Final Environmental Impact Statement (FEIS) pursuant to the National Environmental Policy Act (NEPA). As discussed in Section 2.2.1, PLP revised its application during the NEPA and CWA Section 404 review processes, and the final revision (the 2020 Mine Plan) was submitted to USACE in June 2020.

[16] Mine claims may be located by what is known as aliquot part legal description, which is meridian, township, range, section, quarter section, and if applicable quarter-quarter section. These claims are known as MTRSC locations, and they are generally located using global positioning system (GPS) latitude and longitude coordinates. A quarter section location is typically about 160 acres in size, and a quarter-quarter section location is typically 40 acres in size (ADNR 2022a).

2.1.2 Overview of the 2020 Mine Plan

This section describes the 2020 Mine Plan, as presented in PLP's June 8, 2020 CWA Section 404 permit application to USACE (PLP 2020b).[17] The 2020 Mine Plan is evaluated in USACE's FEIS and is identified in the FEIS as Alternative 3 – North Road Only Alternative, Concentrate Pipeline and Return Pipeline Variant.

In the 2020 Mine Plan, PLP proposes to develop the Pebble copper-gold-molybdenum porphyry deposit as a surface mine. The closest communities are the villages of Iliamna, Newhalen, and Nondalton, each of which is approximately 17 miles from the deposit (USACE 2020b). The 2020 Mine Plan would progress through four distinct phases: construction, operations (also referred to as production), closure, and post-closure. The construction period would last approximately 4 years, followed by 20 years of operation. Closure, including physical reclamation of the mine site, is projected to take approximately 20 years. Post-closure activities, including long-term water management and monitoring, is expected to last for centuries (USACE 2020a).

The project consists of four primary elements: the mine site; the Diamond Point port; the transportation corridor, including concentrate and water return pipelines; and the natural gas pipeline and fiber optic cable (Figure 2-1). Between 2018 and 2020, EPA reviewed all four of the primary elements of the 2020 Mine Plan as part of its review of PLP's CWA Section 404 permit application (EPA 2019a), the Draft Environmental Impact Statement (DEIS) (EPA 2019b) and other documents related to the NEPA review, and during the 12-week coordination process with USACE in spring 2020 to evaluate PLP's proposed project for compliance with the CWA Section 404(b)(1) Guidelines. In its Record of Decision (ROD) denying PLP's CWA Section 404 permit application, USACE specifically finds that the discharges of dredged or fill material at the mine site associated with the 2020 Mine Plan would cause significant degradation to the aquatic ecosystem pursuant to the Guidelines (USACE 2020b). Similarly, EPA focused its evaluation during the CWA Section 404(c) process on the adverse effects of the discharges of dredged or fill material proposed at the mine site because, based on the review of the available information, the adverse effects on anadromous fishery areas associated with mine site discharges would be the most significant of the four primary elements of the 2020 Mine Plan.

2.1.2.1 Mine Site

According to USACE, the 2020 Mine Plan is proposed to be a conventional drill, blast, truck, and shovel operation with a mining rate of up to 73 million tons of ore per year. Approximately 1,300 million tons of mineralized rock and 150 million tons of waste rock and overburden would be mined over the project's life. The mineralized material would be crushed and sent to a coarse ore stockpile to feed the process plant. The process plant would include grinding and flotation steps, with a processing rate of up to 66 million tons per year, to produce on average 613,000 tons of copper-gold concentrate and 15,000 tons of molybdenum concentrate annually (USACE 2020b).

[17] Pebble Project Department of the Army Application for Permit POA-2017-00271.

2.2 Background

2.2.1 Timeline of Key Events Related to the Pebble Deposit (1984–October 2021)

In 1984, the State of Alaska adopted the *Bristol Bay Area Plan for State Lands* (BBAP). The 1984 BBAP placed fish and wildlife habitat and harvest as a primary use throughout the Bristol Bay study area (ADNR 1984a). To carry out its goals, the 1984 BBAP included Mineral Closing Order (MCO) 393, along with 18 other MCOs, which closed the stream channel plus 100 feet on either side of designated anadromous reaches of 64 streams in the Bristol Bay region to new mineral entry. Implementing MCO 393 was consistent with ADNR's determination that new mineral entry "creates an incompatible surface use conflict with salmon propagation and production, and jeopardizes the economy of the Bristol Bay region and the management of the commercial, sport, and subsistence fisheries in the Bristol Bay area" (ADNR 1984b: Page 2). The BBAP was subsequently amended in 2005 and 2013, but the MCOs established by the initial 1984 BBAP were not affected by these amendments.[18] While the protections associated with MCO 393 apply to portions of the SFK, NFK, and UTC located downstream of the Pebble deposit,[19] the portions of SFK, NFK, and UTC and their tributaries that overlie the Pebble deposit and would be directly affected by the 2020 Mine Plan are not covered by MCO 393.

The Pebble deposit was first explored by Cominco Alaska, a division of Cominco Ltd, now Teck, between 1985 and 1997, with exploratory drilling between 1988 and 1997 (Ghaffari et al. 2011). In November 1987, Teck staked claims in the Pebble prospect and added claims to that area in July 1988. In 2001, Northern Dynasty Minerals Ltd. (NDM) acquired claims related to the Pebble deposit. From 2001 to 2019, NDM, and subsequently PLP,[20] conducted significant mineral exploration at the Pebble deposit, including deposit delineation, and developed environmental, socioeconomic, and engineering studies of the Pebble deposit (Kalanchey et al. 2021).

Beginning in 2004, NDM engaged with USACE in pre-CWA Section 404 permit application meetings. Through these meetings, USACE confirmed that NDM/PLP would need a CWA Section 404 permit to develop a mine at the Pebble deposit and that the permit review process would include a public interest

[18] The 2013 BBAP designates land uses in the footprint of the 2020 Mine Plan. The 2013 BBAP specifies that these lands are to be retained in public ownership and managed for multiple uses—including recreation, timber, minerals, and fish and wildlife—as well as natural scenic, scientific, and historic values (USACE 2020b). This specification does not preclude construction of the mine and related facilities, and the State of Alaska has made no specific determinations whether the 2020 Mine Plan is consistent with the BBAP (USACE 2020b).

[19] Specifically, MCO 393 closed the designated anadromous portions of the South Fork Koktuli River (AWC # 325-30-10100-2202-3080), North Fork Koktuli River (AWC # 325-30-10100-2202-3080-4083), and Upper Talarik Creek (AWC # 324-10-10150-2183), as well as any state-owned lands 100 feet from ordinary high water (on both sides of the stream) to new mineral entry (ADNR 1984b).

[20] PLP was created in 2007 by co-owners NDM and Anglo American PLC to design, permit, construct, and operate a long-life mine at the Pebble deposit (Ghaffari et al. 2011). In 2013, NDM acquired Anglo American's interest in PLP, and NDM now holds a 100 percent interest in PLP (Kalanchey et al. 2021).

review, development of an environmental document in accordance with NEPA, and a review for compliance with the CWA Section 404(b)(1) Guidelines (Lestochi pers. comm.).

Also in 2004, EPA Region 10 met numerous times with NDM to discuss the potential environmental impacts associated with developing a mine at the Pebble deposit, including early environmental baseline study plans and preparation for the review of the mine project pursuant to NEPA and Section 404 of the CWA. Later that year, NDM established and began coordinating a Baseline Environmental Team of federal and state agency technical staff, including EPA Region 10, to continue reviewing the draft environmental baseline study plans. NDM also provided periodic updates on its process to develop a mine, as well as findings from its environmental baseline studies and findings related to cultural resources that could be affected.

In 2006, NDM submitted water rights permit applications to ADNR for water rights to use UTC and the Koktuli River in mining operations (NDM 2006). In total, NDM applied for rights to approximately 35 billion gallons of groundwater and surface water per year (ADNR 2022b).

Between 2007 and 2010, nine state and federal agencies, including Alaska Department of Fish and Game (ADF&G), ADNR, National Marine Fisheries Service (NMFS), National Park Service (NPS), USACE, U.S. Fish and Wildlife Service (USFWS), and EPA Region 10 participated in the Pebble Project Technical Working Group, which was formed by PLP to facilitate coordinated agency review of environmental studies to support future NEPA and subsequent permitting actions (ADNR 2022b).

On May 2, 2010, former EPA Administrator Lisa P. Jackson and former Region 10 Regional Administrator Dennis McLerran received a letter from six federally recognized Bristol Bay tribal governments requesting that EPA initiate a process under Section 404(c) of the CWA to protect waters, wetlands, fishes, wildlife, fisheries, subsistence, and public uses in the Nushagak and Kvichak River watersheds and Bristol Bay from metallic sulfide mining, including a potential Pebble mine. Signatories included Nondalton Tribal Council, New Stuyahok Traditional Council, Levelock Village Council, Ekwok Village Council, Curyung Tribal Council, and Koliganek Village Council. Subsequently, three additional federally recognized Bristol Bay tribal governments signed this letter: Native Village of Ekuk, Village of Clark's Point, and Twin Hills Village Council.

Following the letter from the tribes, EPA and former President Obama received numerous letters from additional partners and stakeholders expressing their interests and concerns regarding potential EPA action to protect Bristol Bay fishery resources. Some requests favored immediate action to comprehensively protect Bristol Bay, including a public process under Section 404(c) of the CWA. Others favored a targeted CWA Section 404(c) action that would restrict only mining associated with the Pebble deposit. In addition to other Bristol Bay tribes, EPA received letters from the Bristol Bay Native Association, the Bristol Bay Native Corporation, other tribal organizations, stakeholder groups dependent on the fishery (i.e., commercial and recreational fishers, seafood processors and marketers, chefs and restaurant and supermarket owners, and sport fishing and hunting lodge owners and guides), sporting goods manufacturers and vendors, a coalition of jewelry companies, conservation organizations, members of the faith community, and elected officials from Alaska and other states.

Other requests received during this time urged EPA to refrain from taking action under CWA Section 404(c). These requests included those that asked for more time to understand potential implications of mine development in the Bristol Bay watershed. Others requested EPA wait until formal mine permit applications had been submitted and an EIS had been developed. These requestors included four federally recognized Bristol Bay tribal governments (Newhalen Tribal Council, South Naknek Tribal Council, King Salmon Traditional Village Council, and Iliamna Village Council), other tribal organizations, former Governor Parnell of Alaska, and attorneys representing PLP.

In response to requests, EPA met with tribal governments and stakeholders, including those that supported and those that opposed a mine at the Pebble deposit, to hear their concerns and receive any information they wished to provide. These meetings occurred in the villages in the Bristol Bay watershed and in Anchorage, Alaska, Seattle, Washington, and Washington, DC.

Former EPA Administrator Jackson and former Region 10 Regional Administrator McLerran visited Alaska in August 2010 to learn about the challenges facing rural Alaska towns and Alaska Native villages. Their itinerary included a meeting with PLP for a briefing on the proposed mining of the Pebble deposit. They also visited Dillingham, where they participated in two listening sessions, one specifically for tribal leaders from Bristol Bay and one meeting open to all local and regional entities.

In February 2011, NDM submitted a preliminary assessment for mining the Pebble deposit to the U.S. Securities and Exchange Commission (SEC) (SEC 2011) entitled *Preliminary Assessment of the Pebble Project, Southwest Alaska* (Ghaffari et al. 2011). The preliminary assessment described three stages of mine development at the Pebble deposit: an initial 2-billion-ton mine consisting of 25 years of open-pit mining, a 3.8-billion-ton mine consisting of 45 years of open-pit mining, and a 6.5-billion-ton mine consisting of 78 years of open-pit mining. The preliminary assessment also indicated that the total Pebble mineral resource might approach 11 billion tons of ore.

Also in February 2011, in response to the competing requests regarding CWA Section 404(c) described previously, former Region 10 Regional Administrator McLerran announced EPA's intent to conduct a scientific assessment to evaluate how future large-scale mining projects might affect water quality and Bristol Bay's salmon fishery. This ecological risk assessment was ultimately entitled *Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay, Alaska* (Bristol Bay Assessment or BBA).[21] Concurrent with this announcement, EPA Region 10 notified by letter 31 Bristol Bay tribes, ADEC, ADF&G, ADNR, the Bureau of Land Management, NMFS, NPS, USACE, USFWS, and the U.S. Geological Survey (USGS) of its intent to develop the BBA. The same week, EPA Region 10 met with Nuna Resources, which represents several Alaska Native Claims Settlement Act (ANCSA) Village Corporations,[22] and had meetings with other partners and stakeholders. NFMS, USFWS, and USGS

[21] EPA conducted the BBA consistent with its authority under CWA Section 104(a) and (b).

[22] Congress created Regional and Village Corporations (Alaska Native Corporations) to manage the lands, funds, and other assets conveyed to Alaska Natives by ANCSA.

worked closely with EPA on the development of the BBA, including authoring appendices to the BBA (see Table 2-1 for a timeline of BBA development).[23]

In December 2011, PLP provided EPA Region 10 with an advance, embargoed copy of its more than 25,000-page environmental baseline document, which presented the results of baseline studies conducted from 2004 through 2008 (PLP 2011). The environmental baseline document was designed to characterize the existing physical, chemical, biological, and social environments in the SFK, NFK, and UTC watersheds where the Pebble deposit is located, as well as the proposed mine's transportation corridor that would link the mine site to a proposed port site on Cook Inlet. The extensive environmental baseline document developed by PLP (PLP 2011) and NDM's preliminary assessment for mining the Pebble deposit that was submitted to the SEC in February 2011 (Ghaffari et al. 2011) were key resources used in the development of the BBA.

EPA's purpose in conducting the BBA was to characterize the biological and mineral resources of the Bristol Bay watershed; increase understanding of the potential impacts of large-scale mining on the region's fish resources, in terms of both day-to-day operations and potential accidents and failures; and inform future decisions by government agencies and others related to protecting and maintaining the chemical, physical, and biological integrity of the watershed. The BBA represents a review and synthesis of information available at that time to identify and evaluate potential risks of future large-scale mining development on the Bristol Bay watershed's fish habitats and populations and consequent effects on the region's wildlife and Alaska Native communities.

Table 2-1. Bristol Bay Assessment timeline.

2/7/2011	Announced intent to conduct the BBA.
8/2011	Met with Intergovernmental Technical Team to gather information to inform the scope of the BBA.
2/24/2012	Invited the public to nominate qualified experts to be considered for the external peer review panel.
3/2012	Distributed internal review draft of the BBA for Agency technical review.
5/18/2012	Released first external review draft of the BBA for public comment and external peer review.
5/31/2012 and 6/4–7/2012	Held public meetings in Dillingham, Naknek, New Stuyahok, Nondalton, Levelock, Igiugig, Anchorage, and Seattle to communicate the results of the draft BBA and receive public comments.
6/5/2012	Announced the names of the 12 independent peer reviewers to review the draft BBA and released the draft charge questions, providing the public the opportunity to comment on the draft charge questions.
8/7–9/2012	Held external peer review meeting in Anchorage.
11/2012	Released the final peer review report containing the external peer review of the May 2012 draft of the BBA.
4/30/2013	Released second external review draft of the BBA for public comment and follow-on review by external peer reviewers, to evaluate how well the second external review draft responded to peer reviewers' comments on the first external review draft.
1/15/2014	Released the final BBA and EPA Response to Peer Review Comments document.
3/21/2014	Released EPA Response to Public Comments documents.

[23] For more information about EPA's efforts in Bristol Bay or copies of the Bristol Bay Assessment, see http://www.epa.gov/bristolbay.

Meaningful engagement with tribal governments, Alaska Native Corporations, and all stakeholders was essential to ensure that EPA heard and understood the full range of perspectives on both the BBA and potential effects of mining in the region. EPA released two drafts of the BBA for public comment. Approximately 233,000 and 890,000 comments were submitted to the EPA docket during the 60-day public comment periods for the May 2012 and April 2013 drafts, respectively. EPA also held eight public comment meetings in May and June 2012 in Dillingham, Naknek, New Stuyahok, Nondalton, Levelock, Igiugig, Anchorage, and Seattle. Approximately 2,000 people attended these meetings. An overview of these meetings was shared via two webinars in July 2012.

Consistent with Executive Order 13175, entitled *Consultation and Coordination with Indian Tribal Governments,* and EPA Region 10 Tribal Consultation and Coordination Procedures (EPA 2012), EPA Region 10 invited all 31 Bristol Bay tribal governments to participate in consultation and coordination on both drafts of the BBA. Pursuant to Public Law 108-199, 118 Stat. 452, as amended by Public Law 108-447, 118 Stat. 3267, EPA also invited all 26 Alaska Native Corporations in Bristol Bay to participate in engagement on both drafts of the BBA. Throughout the development of the BBA, 20 tribal governments and one tribal consortium participated in the consultation and coordination process, and 17 Alaska Native Corporations participated in the engagement process.

The BBA also underwent external peer review by a panel of 12 independent experts (Table 2-1). The peer review panel reviewed the May 2012 draft and provided EPA with their comments. A 3-day peer review meeting was held in Anchorage on August 7 through 9, 2012, during which peer reviewers heard testimony from approximately 100 members of the public. The peer review panel also reviewed the April 2013 draft and provided EPA with a second round of comments that evaluated whether the April 2013 draft was responsive to their original comments.

In January 2014, EPA released both the final BBA (EPA 2014) and the final Response to Peer Review Comments document. In March 2014, EPA released the final Response to Public Comments documents for both the May 2012 and April 2013 drafts of the BBA.

On February 28, 2014, after careful consideration of available information, including information collected as part of the BBA, other existing scientific and technical information, and extensive information provided by stakeholders, EPA Region 10 notified USACE, the State of Alaska, and PLP that it had decided to proceed under the CWA Section 404(c) regulations, 40 CFR 231, to review potential adverse environmental effects of discharges of dredged or fill material associated with mining the Pebble deposit. EPA Region 10 stated that it was taking this step because it had reason to believe that porphyry copper mining of the scale contemplated at the Pebble deposit could result in unacceptable adverse effects on fishery areas. In accordance with the regulation at 40 CFR 231.3(a)(1), EPA Region 10 provided USACE, the State of Alaska, and PLP an opportunity to submit information for the record, to demonstrate to the satisfaction of the EPA Region 10 Regional Administrator that no unacceptable adverse effects on aquatic resources would result from discharges associated with mining the Pebble deposit, or that USACE intended to take corrective action to prevent unacceptable adverse effects satisfactory to the EPA Region 10 Regional Administrator.

Also on February 28, 2014, EPA Region 10 invited all 31 Bristol Bay tribal governments to participate in tribal consultation, and all 26 Alaska Native Corporations to participate in consultation and engagement on the 2014 Proposed Determination. In total, 17 tribal governments participated in the consultation process, and 6 Alaska Native Corporations participated in the consultation and engagement process.

EPA Region 10 held two meetings on March 25, 2014, one with PLP executives and one with the Alaska Attorney General. On April 29, 2014, PLP and the Alaska Attorney General separately provided information as part of the initial CWA Section 404(c) consultation period. In these submittals, PLP and the Alaska Attorney General raised several legal, policy, scientific, and technical issues, including questions regarding EPA's authority to initiate a CWA Section 404(c) review before PLP had submitted a CWA Section 404 permit application to USACE, the scientific credibility of the BBA, and whether the BBA should be used to inform decision-making under CWA Section 404(c). Most of the scientific and technical issues detailed in these documents had been raised before; EPA had provided responses to these issues in individual correspondence to PLP and the Alaska Attorney General and, most comprehensively, in the 400-page BBA Response to Peer Review Comments document released in January 2014 and the 1,200-page BBA Response to Public Comments documents released in March 2014.

By letter dated March 14, 2014, USACE responded to EPA's February 28, 2014 letter. In its response, USACE did not notify the Regional Administrator of its intent to take corrective action to prevent an unacceptable adverse effect.

After fully considering the April 29, 2014 submittals from PLP and the Alaska Attorney General and the March 14, 2014 letter from USACE, the EPA Region 10 Regional Administrator was not satisfied that no unacceptable adverse effect could occur and USACE did not notify the Regional Administrator of its intent to take corrective action to prevent an unacceptable adverse effect. Thus, EPA Region 10 decided to take the next step in the CWA Section 404(c) process, publication of a proposed determination.

On July 21, 2014, EPA Region 10 published in the *Federal Register* a Notice of Proposed Determination under Section 404(c) of the CWA to restrict the use of certain waters in the SFK, NFK, and UTC watersheds as disposal sites for dredged or fill material associated with mining the Pebble deposit (79 FR 42314, July 21, 2014). The notice started a public comment period that ended on September 19, 2014. EPA Region 10 also held seven hearings during the week of August 11, 2014. These hearings took place in Anchorage, Nondalton, New Stuyahok, Dillingham, Kokhanok, Iliamna, and Igiugig. More than 830 community members participated in the seven hearings, more than 300 of whom provided oral statements. In addition to testimony taken at the hearings, EPA Region 10 received more than 670,000 written comments during the public comment period, more than 99 percent of which supported the 2014 Proposed Determination. The public comments and transcripts from the public hearings can be found in the docket for the 2014 Proposed Determination.[24]

[24] Information regarding the 2014 Proposed Determination can be found in the docket for this effort at www.regulations.gov, docket ID No. EPA-R10-OW-2014-0505.

Before EPA could reach the next step in the CWA Section 404(c) review process—to either withdraw the 2014 Proposed Determination or prepare a recommended determination pursuant to 40 CFR 231.5(a)—PLP filed multiple lawsuits against the Agency. On November 25, 2014, the U.S. District Court for the District of Alaska (District Court) issued a preliminary injunction against EPA in one of those lawsuits, which halted EPA Region 10's CWA Section 404(c) review process until the case was resolved (Order Granting Preliminary Injunction at 1-2, Pebble Limited Partnership v. EPA, No. 3:14-cv-00171 (D. Alaska Nov. 25, 2014)). On May 11, 2017, EPA and PLP settled that lawsuit, as well as PLP's other outstanding lawsuits, and the court subsequently dissolved the injunction and dismissed the case with prejudice.

Under the terms of the settlement, EPA agreed to "initiate a process to propose to withdraw the Proposed Determination" by July 11, 2017. EPA also agreed not to forward a signed recommended determination to EPA Headquarters until May 11, 2021, or until EPA published a notice of USACE's FEIS on PLP's CWA Section 404 permit application for the proposed Pebble mine, whichever came first. To take advantage of this period of forbearance, PLP was required to submit its CWA Section 404 permit application to USACE within 30 months of execution of the settlement agreement.[25]

On July 11, 2017, EPA signed a *Federal Register* notice that initiated the process and proposed to withdraw the 2014 Proposed Determination. Also on July 11, 2017, EPA invited all 31 Bristol Bay tribal governments to participate in consultation and coordination, and all 26 Alaska Native Corporations to participate in consultation on the 2017 proposal to withdraw. In total, 18 tribal governments and 3 Alaska Native Corporations participated in the consultation processes.

On July 19, 2017, in accordance with the terms of the settlement agreement, EPA Region 10 published in the *Federal Register* a notice of its proposal to withdraw the 2014 Proposed Determination (82 FR 33123, July 19, 2017). EPA stated that the Agency was proposing to withdraw the 2014 Proposed Determination because it would (1) provide PLP with additional time to submit a CWA Section 404 permit application to USACE; (2) remove any uncertainty, real or perceived, about PLP's ability to submit a permit application and have that permit application reviewed; and (3) allow the factual record regarding any forthcoming permit application to develop. EPA explained that "[i]n light of the basis upon which EPA is considering withdrawal of the Proposed Determination, EPA is not soliciting comment on the proposed restrictions or on science or technical information underlying the Proposed Determination" (82 FR 33124, July 19, 2017).

The July 19, 2017 notice started a public comment period that ended on October 17, 2017. EPA also held hearings in Dillingham and Iliamna the week of October 9, 2017. EPA received more than one million public comments regarding its proposal to withdraw the 2014 Proposed Determination. Approximately 99 percent of commenters expressed opposition to the withdrawal of the 2014 Proposed Determination. The public comments, transcripts from the public hearings, and summaries of the tribal and Alaska

[25] For a copy of the settlement agreement, *see* https://www.epa.gov/bristolbay/2017-settlement-agreement-between-epa-and-pebble-limited-partnership.

Native Corporation consultations can be found in the docket for the 2017 proposal to withdraw the 2014 Proposed Determination.[26]

On December 22, 2017, PLP submitted to USACE a CWA Section 404 permit application for the discharge of dredged and fill material to waters of the United States to develop a mine at the Pebble deposit, as well as associated infrastructure (e.g., ports, roads, and pipelines). On January 5, 2018, USACE issued a public notice that provided PLP's permit application to the public and stated that an EIS would be required as part of its permit review process, consistent with NEPA. USACE also invited relevant federal, state, and local agencies, as well as tribal governments, to be cooperating agencies on the development of this EIS. EPA, the United States Coast Guard, the Bureau of Safety and Environmental Enforcement, the Advisory Council on Historic Preservation, USFWS, NPS, the Pipeline and Hazardous Materials Safety Administration, the State of Alaska, the Lake and Peninsula Borough, the Curyung Tribal Council, and the Nondalton Tribal Council accepted the USACE invitation and became NEPA cooperating agencies.

On January 26, 2018, EPA Region 10 announced a "suspension" of the proceeding to withdraw the 2014 Proposed Determination. This action was published in the *Federal Register* on February 28, 2018 (83 FR 8668, February 28, 2018).

On March 29, 2018, USACE published in the *Federal Register* a Notice of Intent to prepare an EIS and a Notice of Scoping for the Pebble Project (83 FR 13483, March 29, 2018). The EIS scoping public comment period opened on April 1, 2018 and closed on June 29, 2018. USACE received 174,889 total submissions during the scoping comment period, which are summarized in the FEIS, Appendix A. On June 29, 2018, EPA Region 10 submitted a comment letter to USACE, pursuant to the White House Council on Environmental Quality (CEQ) NEPA regulations and Section 309 of the Clean Air Act (CAA), that contained recommendations for the EIS in response to the scoping process.

On March 1, 2019, USACE released the DEIS for public comment. Also on March 1, 2019, USACE published a public notice soliciting comment on PLP's CWA Section 404 permit application (Public Notice POA-2017-00271). The public comment period for both the DEIS and the CWA Section 404 permit application opened on March 1, 2019 and closed July 1, 2019. USACE also held nine public hearings on the DEIS throughout March and April 2019. USACE received 311,885 public comments on the DEIS, which are summarized in the FEIS, Appendix D. USACE held public hearings on the DEIS in Naknek, Kokhanok, Newhalen, Igiugig, New Stuyahok, Nondalton, Dillingham, Homer, and Anchorage, Alaska.

On July 1, 2019, EPA sent a letter to USACE with its comments and recommendations on the DEIS, pursuant to EPA's review responsibilities under the CEQ NEPA regulations and CAA Section 309 (EPA 2019b). On July 1, 2019, EPA sent a separate letter to USACE with comments on the CWA Section 404 permit public notice (EPA 2019a). These EPA comment letters included more than 160 pages of comments in which EPA identified substantial potential impacts and risks of the proposed project.

[26] Information regarding the proposal to withdraw can be found in the docket for this effort at www.regulations.gov, see docket ID No. EPA-R10-OW-2017-0369.

On August 30, 2019, after conferring with EPA's General Counsel,[27] EPA Region 10 published in the *Federal Register* its decision to withdraw the 2014 Proposed Determination, thereby concluding the withdrawal process that was initiated on July 19, 2017 (84 FR 45749, August 30, 2019). EPA identified that it was withdrawing the 2014 Proposed Determination because (1) new information had been generated since 2014, including information and preliminary conclusions in USACE's DEIS, which EPA would need to consider before any potential future decision-making regarding the matter; (2) the record would continue to develop throughout the permitting process; and (3) EPA could and then had initiated the CWA Section 404(q) Memorandum of Agreement dispute resolution process[28] and it was appropriate to use that process to resolve issues before engaging in any potential future decision-making regarding the matter.

In its August 30, 2019 notice of withdrawal of the 2014 Proposed Determination, EPA stated that "[a]s in EPA's prior notices, EPA is not basing its decision-making on technical consideration or judgments about whether the mine proposal will ultimately be found to meet the requirements of the 404(b)(1) Guidelines or results in 'unacceptable adverse effects' under CWA section 404(c)" (84 FR 45756, August 30, 2019).

In October 2019, twenty tribal, fishing, environmental, and conservation groups challenged EPA's withdrawal of the 2014 Proposed Determination in the District Court. The District Court granted EPA's motion to dismiss the case.

In February 2020, USACE released the preliminary FEIS to the cooperating agencies for comment. EPA Region 10 submitted comments and recommendations to the USACE on the preliminary FEIS on March 26, 2020.

From March 12, 2020 through May 28, 2020, an interagency team of managers and scientific and technical staff from USACE, EPA, and USFWS met weekly to evaluate the proposed project for compliance with the CWA Section 404(b)(1) Guidelines.

Based on its review of the CWA Section 404(b)(1) Guidelines, USACE determined that EIS Alternative 3 (North Road Only with concentrate and return water pipelines) was the least environmentally damaging practicable alternative (LEDPA). In June 2020, PLP submitted to USACE a revised permit application (i.e., the 2020 Mine Plan) to incorporate changes to the project based on USACE's LEDPA determination

[27] See footnote 13 in Section 1.

[28] CWA Section 404(q) directs the Secretary of the Army to enter into agreements with various federal agencies, including EPA "to minimize, to the maximum extent practicable, duplication, needless paperwork, and delays in the issuance of permits under this section" (33 U.S.C. 1344(q)). EPA and USACE have entered into various agreements pursuant to Section 404(q). The operative agreement was entered in 1992. Part IV, paragraph 3 of the 1992 EPA and Army Memorandum of Agreement to implement Section 404(q) (hereinafter referred to as the "404(q) MOA") sets forth the "exclusive procedures" for elevation of individual permits cases (EPA and DA 1992).

(USACE 2020b). USACE determined that the changes to the project described in the revised permit application were not significant enough to warrant development of a Supplemental DEIS.[29]

On July 24, 2020, USACE published a Notice of Availability for the FEIS in the *Federal Register* (USACE 2020a).

On November 20, 2020, USACE issued its ROD denying PLP's CWA Section 404 permit application on the basis that the proposed project would not comply with the CWA Section 404(b)(1) Guidelines and would be contrary to the public interest (USACE 2020b). The USACE permit denial addresses only PLP's specific permit application. By letter dated November 25, 2020, USACE notified PLP that the proposed project failed to comply with the CWA Section 404(b)(1) Guidelines because "the proposed project would cause unavoidable adverse impacts to aquatic resources which would result in Significant Degradation to aquatic resources" (USACE 2020b: Transmittal Letter, Page 1) and that PLP's compensatory mitigation plan submitted to USACE on November 4, 2020, did not alter that finding.

On January 19, 2021, PLP filed a request for an appeal of the USACE permit denial with USACE, pursuant to 33 CFR Part 331. USACE accepted the appeal on February 25, 2021. USACE's review of the appeal is ongoing.

On June 17, 2021, the Ninth Circuit Court of Appeals reversed the District Court's decision to dismiss the tribal, fishing, environmental, and conservation groups' challenge to EPA's withdrawal of the 2014 Proposed Determination. The Ninth Circuit concluded that under EPA's regulations at 40 CFR 231.5(a), EPA is authorized to withdraw a proposed determination "*only* if the discharge of materials would be unlikely to have an unacceptable adverse effect." *Trout Unlimited v. Pirzadeh*, 1 F.4th 738, 757 (9th Cir. 2021) (emphasis in original). The Ninth Circuit remanded the case to the District Court for further proceedings.

On September 28, 2021, EPA filed a motion in the District Court requesting that the court vacate the Agency's 2019 decision to withdraw the 2014 Proposed Determination and remand the action to the Agency for reconsideration. The District Court granted EPA's motion on October 29, 2021.

2.2.2 Re-initiation of Clean Water Act Section 404(c) Review Process (November 2021–Present)

The District Court's vacatur of EPA's 2019 decision to withdraw the 2014 Proposed Determination had the effect of reinstating the 2014 Proposed Determination and reinitiating EPA's CWA Section 404(c) review process. Because the next step in the CWA Section 404(c) review process required the EPA Region 10 Regional Administrator to, within 30 days, decide whether to withdraw the 2014 Proposed Determination or prepare a recommended determination, EPA Region 10 published in the *Federal Register* on November 23, 2021, a notice extending the applicable time requirements through May 31, 2022, to consider available information and determine the appropriate next step in the CWA Section

[29] PLP also submitted an updated permit application to USACE in December 2019 and USACE made a similar finding at that time that a Supplemental DEIS was not warranted.

SECTION 6. OTHER CONCERNS AND CONSIDERATIONS

The basis for EPA's final determination is the unacceptable adverse effects on fishery areas from certain discharges of dredged or fill material associated with proposed mining at the Pebble deposit, which is discussed in detail in Section 4. This section describes additional concerns and information that, while not the basis for EPA's final determination, are related to discharges of dredged or fill material associated with developing the Pebble deposit.

6.1 Other Potential CWA Section 404(c) Resources

CWA Section 404(c) authorizes EPA to exercise its discretion to act whenever it determines that the discharge of dredged or fill material will have an unacceptable adverse effect on specific aquatic resources. CWA Section 404(c) provides the following:

> The Administrator is authorized to prohibit the specification (including the withdrawal of specification) of any defined area as a disposal site, and he is authorized to deny or restrict the use of any defined area for specification (including the withdrawal of specification) as a disposal site, whenever he determines, after notice and opportunity for public hearings, **that the discharge of such materials into such area will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas**. Before making such determination, the Administrator shall consult with the Secretary. The Administrator shall set forth in writing and make public his findings and his reasons for making any determination under this subsection. [33 USC 1344(c)] [emphasis added]

Section 4 of this final determination considers the adverse effects from the discharge of dredged or fill material on fishery areas. Section 6.1 evaluates the potential for adverse effects on wildlife, recreation, and water supplies.

6.1.1 Wildlife

Unlike most terrestrial ecosystems, the Bristol Bay watershed has undergone little development and remains largely intact. Thus, it still supports its historical complement of species, including large carnivores, such as brown bears, bald eagles, and gray wolves; ungulates such as moose and caribou; and numerous bird species. For example, more than 40 mammal species are thought to regularly occur in the Nushagak and Kvichak River watersheds (Brna and Verbrugge 2013). At least 13 of these species are known, or have the potential based on the presence of suitable habitat, to occur in the SFK, NFK, and UTC watersheds: brown bear, moose, caribou, gray wolf, red fox, river otter, wolverine, arctic ground squirrel, red squirrel, beaver, northern red-backed vole, tundra vole, and snowshoe hare (PLP 2011: Chapter 16). One of two freshwater harbor seal populations in North America is found in Iliamna Lake (Smith et al. 1996).

As many as 134 species of birds occur in the Nushagak and Kvichak River watersheds (Brna and Verbrugge 2013), and at least 37 waterfowl species have been observed in the SFK, NFK, and UTC watersheds, 21 of which have been confirmed as breeders (PLP 2011: Chapter 16). The region's aquatic habitats support migratory and wintering waterfowl. These habitats include an important staging area for many species, including emperor geese, Pacific brant, and ducks, during spring and fall migrations. Twenty-eight landbird and 14 shorebird species have also been documented in the SFK, NFK, and UTC watersheds (PLP 2011: Chapter 16). The Bristol Bay watershed supports millions of marine birds throughout the year and is one of the world's most productive areas for marine birds (Warnock and Smith 2018). Two areas in the region, Kvichak Bay and Nushagak Bay, are designated as Western Hemisphere Shorebird Reserve Network sites (WHSRN 2022a, 2022b). The FEIS identifies bird species protected under the Migratory Bird Treaty Act of 1918, the Bald and Golden Eagle Protection Act, and bird species of concern within its mine site analysis area (USACE 2020a: Section 4.23).

Species found in the Nushagak and Kvichak River watersheds may have home ranges or migration patterns that extend beyond the watersheds as well (e.g., brown bears, caribou, and migratory birds). Several bird species found within the watersheds are considered species of special concern and are already experiencing population declines due to climate change effects on their preferred foraging fish (USACE 2020b). Within the Nushagak and Kvichak River watersheds, there are no known breeding or otherwise significant occurrences of any species listed as threatened or endangered under the Endangered Species Act, nor is there any designated critical habitat.

Wildlife present in the SFK, NFK, and UTC watersheds—several of which are essential subsistence species (Section 6.3.1)—would likely be adversely affected by large-scale mining at the Pebble deposit. Direct impacts of mining on resident and migratory wildlife species would include, but are not limited to, loss of terrestrial and aquatic habitat, reduced habitat effectiveness (e.g., in otherwise suitable habitats adjacent to the mine area), habitat fragmentation, increased stress and avoidance due to noise pollution, and increased conditioning on human food (EPA 2014: Chapter 12). Direct habitat loss and secondary habitat avoidance would affect the Mulchatna Caribou Herd (USACE 2020b), an important subsistence resource and prey species for wolves and brown bears (EPA 2014: Chapter 12). Brown bears, which are an important recreation species in the region, would experience direct loss of foraging and denning habitat. Impacts on wildlife habitat and consequential wildlife displacement would likely result in a cascading effect, as species compete for new feeding, breeding, and nesting habitats (USACE 2020b). Direct copper toxicity to wildlife resulting from mine operations is less of a concern than indirect effects from copper-related reductions in aquatic communities (EPA 2014: Chapter 12).

In addition to direct mine-related effects, wildlife species would also likely be affected indirectly via any reductions in salmon populations. Marine-derived nutrients imported into freshwater systems by spawning salmon provide the foundation for the region's aquatic and terrestrial foodwebs, via direct consumption of salmon in any of its forms (spawning adults, eggs, carcasses, or juveniles) and nutrient recycling (e.g., transport and distribution of marine derived nutrients from aquatic to terrestrial environmental by wildlife) (Section 3.3.4). Availability and consumption of these salmon-derived resources can have significant benefits for terrestrial mammals and birds, including increases in growth

rates, litter sizes, nesting success, and population densities (Brna and Verbrugge 2013). Waterfowl prey on salmon eggs, parr, and smolts and scavenge salmon carcasses. Carcasses are an important food source for bald eagles, water birds, other land birds, other freshwater fishes, and terrestrial mammals. Aquatic invertebrate larvae also benefit from carcasses and are an important food source for water birds and land birds. Decomposing salmon acts as an organic input to streambed substrate (Cederholm et al. 1999). It is likely that the species identified above would be adversely affected by any mine-related reductions in salmon production.

The FEIS identifies direct and indirect impacts to wildlife that could result at the proposed mine site, including behavioral disturbances, injury and mortality, and habitat changes. Noise and the presence of humans, vehicles, aircraft, and other equipment could result in avoidance of the mine site by wildlife throughout construction, operations, and closure. Mortality of, and injury to, wildlife at the proposed mine site could occur due to vegetation clearing; collisions with vehicles, equipment, and structures; defense of life and property; altered predator and prey relationships; changes in water quality; nest abandonment and/or disturbance; exposure to contaminants; and possible spills. The FEIS estimates the direct loss of 8,390 acres of habitat and the indirect loss of additional habitat surrounding the mine site due to avoidance, which would occur throughout the life of the project and longer in areas that are not restored. Wildlife habitat may also see long-term changes due to the introduction or spread of invasive species, changes in water quality and air quality, and potential spills (USACE 2020a: Section 4.23).

The Expanded Mine Scenario would contribute to cumulative effects of wildlife habitat loss, disturbance, injury, and mortality. The FEIS estimates that 31,541 acres of habitat would be lost at the expanded mine site, as well as additional habitat surrounding the expanded mine site due to avoidance (USACE 2020a: Section 4.23).

The FEIS provides more detailed information not summarized in this final determination regarding other potential direct, indirect, and cumulative impacts that may result from the 2020 Mine Plan and the Expanded Mine Scenario, including species-specific information in some cases.

6.1.2 Recreation

Next to commercial salmon fishing and processing, recreation is the largest private economic sector in the Bristol Bay region (EPA 2014: Appendix E) due mainly to the watershed's remote, pristine wilderness setting and abundant natural resources. Key recreational uses include sport fishing, sport hunting, and other tourism/wildlife viewing recreational trips—all of which are directly or indirectly dependent on the intact, salmon-based ecosystems of the region. Direct regional expenditures on these recreational uses, expressed in terms of 2021 dollars,[100] are estimated at more than $210 million (EPA 2014: Table 5-4). Much of these expenditures are by non-residents, highlighting the fact that the recreational value of Bristol Bay watershed is recognized even by people that live a significant distance from the region. Total visitors to the Bristol Bay region are estimated at 40,00 to 50,000 people annually (McKinley Research Group 2021). In 2019, tourism spending in the Bristol Bay region generated $155

[100] Values adjusted using Anchorage Consumer Price Index.

million in total economic output and 2,300 jobs in Alaska. Recreation in the region diversifies the region's economy through the use of sustainable resources (McKinley Research Group 2021).

In particular, the abundance of large game fishes makes the region a world-class destination for recreational anglers. The 2005 Bristol Bay Angler Survey confirmed that the freshwater rivers, streams, and lakes of the region are a recreational resource equal or superior in quality to other world-renowned sport fisheries (EPA 2014: Appendix E). In 2009, sport anglers took approximately 29,000 sport-fishing trips to the Bristol Bay region (12,000 trips by people living outside of Alaska, 4,000 trips by Alaskans living outside of the Bristol Bay area, and 13,000 trips by Bristol Bay residents) (EPA 2014: Chapter 5). These sport-fishing activities directly employed over 800 full- and part-time workers. At peak times, 92 businesses and 426 guides have operated in the Nushagak and Kvichak River watersheds alone (EPA 2014: Chapter 5). More than 90 lodges and camps operate in the Bristol Bay region, primarily focusing on sport fishing and bear viewing. Lodge and camp guests spent an estimated $77 million in 2019 (McKinley Research Group 2021).

Much of the sport fishery in the region is relatively low-impact catch-and-release, although there is some recreational harvest. Sockeye, Chinook, and Coho salmon are the predominant fishes harvested, although Rainbow Trout, Dolly Varden, Arctic Char, Arctic Grayling, Northern Pike, Chum Salmon, Lake Trout, and whitefish are also important recreational species (Dye and Borden 2018). From 2007 to 2017, the total annual recreational harvest in the Bristol Bay Management Area ranged from roughly 42,000 to 59,000 fish (Dye and Borden 2018). In 2017, an estimated 30,282 Rainbow Trout were caught and 241 Rainbow Trout were harvested in the Nushagak, Wood, and Togiak River watersheds. The same year, an estimated 114,431 Rainbow Trout were caught and 66 Rainbow Trout were harvested in the Kvichak River watershed (Table 3-12) (Romberg et al. 2021).

Sport fishing in the Bristol Bay region is a large and well-recognized share of recreational use and associated visitor expenditures (Section 3.3.7). In addition, thousands of trips to the region each year are made for sport hunting and wildlife viewing. For example, Lake Clark and Katmai National Parks are nationally significant protected lands and are important visitor destinations. Between 2012 and 2021, Katmai National Park and Preserve attracted an average of 41,139 visitors annually, and Lake Clark National Park and Preserve averaged 15,728 visitors annually (NPS 2022). Rivers within Katmai National Park provide the best locations in North America to view wild brown bears (EPA 2014: Appendix E). A 2019 study found that activities related to bear viewing resulted in approximately $34.5 million in sales and $10 million in direct wages and benefits in Southcentral Alaska, and that bear viewing opportunities are "inextricably linked" to Lake Clark and Katmai National Parks (Young and Little 2019). The region is also used for recreational water activities, hiking, backpacking, biking, flightseeing, and other activities, especially in Katmai National Park and Preserve and Lake Clark National Park and Preserve (USACE 2020a: Section 4.5).

Sport hunting for caribou, moose, brown bear, and other species also plays a role in the local economy of the Bristol Bay region. In recent years, approximately 1,323 non-residents and 1,319 non-local residents of Alaska traveled to the region to hunt, spending approximately $6,395 (non-residents) and $1,631

(non-local residents) per trip (expressed in 2021 dollars[101]), respectively (EPA 2014: Chapter 5). These hunting activities result in an estimated $10 million per year in direct hunting-related expenditures (values expressed in 2021 dollars[102]) and directly employ over 100 full- and part-time workers (EPA 2014: Chapter 5).

The 2020 Mine Plan would result in the permanent alteration and loss of 8,391 acres of land at the mine site that are currently available for recreation, including the loss of 2,113 acres of wetlands and other waters that support fish and wildlife and attract recreational anglers and hunters (USACE 2020a: Section 4.5). As described in Section 4.2.1.1, the 2020 Mine Plan would permanently remove 8.5 miles (13.7 km) of streams with documented occurrence of Coho and Chinook salmon, disrupting the spawning cycle and displacing spawners. The substantial spatial and temporal extents of stream habitat losses under the 2020 Mine Plan suggest that these losses would reduce the overall capacity and productivity of Chinook and, particularly, Coho salmon in the NFK watershed. The Nushagak River—to which the SFK and NFK flow—supports the largest Chinook Salmon sport fishery in the United States and, in turn, a network of private and commercial sport-fishing camps overseen by Choggiung, Ltd., the Alaska Native village Corporation for Dillingham, Ekuk, and Portage Creek (NMWC 2007, Choggiung, Ltd. 2014, Dye and Borden 2018). The loss of habitat at the mine site would affect downstream trout habitat, possibly displacing trout and, therefore, anglers (USACE 2020a: Section 4.6). The FEIS acknowledges the potential for economic impacts borne by recreational anglers and affiliated guides and lodges, stating that "affected operators could substitute fishing on different streams, albeit at potentially higher costs to themselves and their consumers" (USACE 2020a: Page 4.6-12).

The FEIS indicates that the mine site itself does not support much recreational use, though construction, operations, and closure of the mine site would affect recreational activities on surrounding lands, including Lake Clark National Park and Katmai National Park (USACE 2020a, 2020b). Noise and the presence of humans, vehicles, aircraft, and other equipment is likely to result in avoidance of the mine site by wildlife that support recreational uses. Changes to the landscape due to visibility of the mine and night sky light pollution would alter the recreational experience for visitors and potentially displace recreation visitors and activities to other areas. These impacts together would reduce the opportunities for solitude (USACE 2020a: Section 4.5). Further, there exists the possibility of a loss in recreational visitors and activity in areas not impacted by the 2020 Mine Plan resulting from the perceived loss of habitat or fishery quality due to the construction and operation of the mine (Glasgow and Train 2018, English et al. 2019, Glasgow and Train 2019).

The Expanded Mine Scenario, which would extend impacts in the SFK and UTC watersheds, would contribute to cumulative effects similar in nature to those described above but over a larger area. The larger mine footprint would further displace wildlife and increase the amount of disturbance in the NFK

[101] Values adjusted using Anchorage Consumer Price Index.
[102] Values adjusted using Anchorage Consumer Price Index.

and SFK watersheds, reducing opportunities for hunting, fishing, and wildlife viewing (USACE 2020a: Section 4.5).

6.1.3 Public Water Supplies

Alaska Native residents of the Nushagak and Kvichak River watersheds consistently stress the importance of clean water to their way of life, not only in terms of providing habitat for salmon and other fishes, but also in terms of providing high-quality drinking water (EPA 2014: Appendix D). Drinking water sources in the region include municipal treated water, piped but untreated water, individual wells, and water hauled directly from rivers and lakes (EPA 2014: Appendix D, Table 3).

At this time, it is difficult to determine what level of effects routine operations of a mine at the Pebble deposit could have on public water supplies in the Nushagak and Kvichak River watersheds. Private wells are a primary drinking water source for many residents of the Nushagak and Kvichak River watersheds, and communities also rely on groundwater for their public water supply. The extent that surface water influences the quality or quantity of the groundwater source for these wells is unknown. However, there are also communities in the area that rely on surface water sources, which may be more susceptible to mine-related contamination. Although no communities are currently located in the SFK, NFK, or UTC watersheds (Figure ES-2), residents of nearby communities use these areas for subsistence hunting and fishing and other activities and may drink from surface waters and springs in these watersheds.

Development of a large-scale mine at the Pebble deposit would require a work force of more than 1,700 people during construction and more than 850 people during mine operation (USACE 2020a: Chapter 2). Thus, the mine site would rival Dillingham as the largest population center in the Bristol Bay watershed during construction and would remain the second-largest population center during operation. This population would require sufficient water supplies in the Pebble deposit region, and these supplies would be vulnerable to contamination or degradation resulting from mine development and operation. The 2020 Mine Plan includes installation of groundwater wells on the northern side of the mine site to supply potable water (USACE 2020a: Section 3.18).

Other public water supplies (e.g., at Iliamna, Newhalen, and Pedro Bay) could be affected by construction of and transport along a roadway and/or pipelines connecting the Pebble deposit region to Cook Inlet. The Safe Drinking Water Act requires states and utilities to assess the source water for public water systems, and there are CWA provisions designed for protecting source waters from contamination. The ADEC Drinking Water Program has delineated drinking water source protection areas for all public water system sources and includes areas along the proposed transportation corridor, the region surrounding Iliamna Lake, and the adjacent communities. Currently, there are no designated drinking water protection areas for private wells in Newhalen, Iliamna, and other villages along the transportation corridor, nor at the mine site (USACE 2020a: Section 3.18).